

# Prevalence of *CANDIDA ALBICANS* among pregnant women in IMO STATE NIGERIA

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## ABSTRACT:

This study was carried out to assess the prevalence of *Candida albicans* the common causative organism of *candidiasis* among the pregnant population of women in the three geopolitical zones of Imo State, south –east Nigeria; Owerri, Orlu and Okigwe. A government owned hospital was chosen as study area in each of the zones i.e. Federal Medical Centre Owerri, Imo State University Teaching Hospital (IMSUTH) Orlu and General Hospital Okigwe and pregnant women attending antenatal clinics not necessarily presenting any disease symptoms were used as study subjects. Selection was by subject consent and presence at the clinic. HighVaginal Swab (HVS) samples were collected from the women and used for analysis in the Microbiology Laboratories of the three hospitals respectively. A total of 578 samples that is 317, 161 and 100 HVS samples were collected from the hospitals respectively; out of which 118 (20.4%) i.e.68, 28 and 22 harboured *Candida albicans*. Questionnaire responses showed that 72.9% i.e. 86 of the subjects screened positive were not aware of any symptom of infection. This prevalence is significant in pregnancy especially when asymptomatic as it can affect the baby during passage through the vagina. There is therefore need for routine surveillance of pregnant women for this *Candida albicans* as a holistic procedure in ante-natal care.

**Keywords:** *Candida albicans*, prevalence, pregnant, women, South-east geopolitical region.

## INTRODUCTION

Ante-natal patients are ordinarily “healthy patients” i.e. not necessarily presenting any symptom of disease. This though does not mean that they are free of microbial infections. They attend the clinic to ascertain their good health and those of their fetuses from time to time, hence they are prone to contact with microorganisms that are of clinical importance [1].

*Candida albicans* (*C. albicans*) is a diploid fungus and a causal agent of opportunistic oral and genital infections in humans [2]. *C.albicans* biofilms readily form on the surface of implantable medical devices. In addition, hospital-acquired infections in patients not previously considered vulnerable have become a cause of major health concern. *Candida* species are part of the lower genital tract flora in 20-50 % of healthy asymptomatic women [3]. Carrier rates are higher in women treated with broad spectrum antibiotics (4), pregnant women, diabetic women [5,6]

The organism has been implicated as the most common cause of vaginitis globally[7,8,9,10,11]. The incidence of candidiasis is almost doubled in pregnant women particularly in the third trimester, there also seems to be a trend for it to recur during pregnancy as a result of the increased levels of estrogens and corticoids reducing the vaginal defense mechanisms against such opportunistic infections as *Candida* [12]. *Candida* thrives well in damp places, especially if the skin is broken or sugar levels in the blood are high. Hence Candidiasis otherwise called ‘Thrush’ is very common in pregnancy (affecting about one in four

women) because a pregnant woman’s vaginal secretions favor the growth of yeast [12].

Vaginal candidiasis is a common gynaecological finding among women worldwide [13, 14]. It has been found that up to 75% of the sexually active women have, at least, at a time experienced symptomatic vaginal candidiasis [15]. The predisposing factors include: Hormonal fluctuations as in pregnancy [16], use of broad spectrum antibiotics [17], luteal phase of menstrual cycle, use of oral contraceptives, and hormone replacement therapy among others [18]. Up to 10% of women do not have obvious predisposing factors and yet present as well with the recurrent type [19]. Symptoms generally include: Itching, burning, soreness, abnormal vaginal discharge, and *dyspareunia* [20, 21]. Most candidial infections are treatable and result in minimal complications, though complication may be severe or fatal if left untreated in certain populations [22].

Although candidiasis (thrush) will probably not affect fertility, it is important to clear up any infection during pregnancy, as it may lead to pregnancy loss [23], also the baby may pick up the infection from the birth canal during delivery. A baby born with candidiasis may have low birth weight [23], can develop diaper rash and a sore mouth, which may lead to feeding difficulties [22].

The prevalence of candidiasis has been shown to vary, both among countries and among different groups within the same country [24]. There is therefore need to determine the epidemiology of candidiasis by

periodically monitoring the prevalence of its etiologic agents. This investigation is therefore set to determine the prevalence of *Candida albicans* among the pregnant population in Imo state, South-East geopolitical area of Nigeria with a view to creating public awareness of the organism, its potentials as an infectious agent as well as proffer preventive strategies.

## METHODOLOGY

### Study location

The research was carried out using antenatal patients of Federal Medical Centre, Owerri, Imo state University Teaching Hospital Orlu and General Hospital Okigwe, which are three major government hospitals in the three respective geopolitical zones of Imo State. The informed consent of the hospital management, laboratory scientists and antenatal patients were sought and obtained.

### Sample and Study population

A total of 578 samples i.e. 317, 161 and 100 HVS samples were collected from the hospitals respectively

by obstetricians. The subjects' consent was obtained for the research.

### Materials

Standard materials for microbial isolation, identification and characterization were used in the research including consumables and non consumables following standard protocols [25].

Interviewee and interviewer administered questionnaires were also used.

### Sample collection

The patients were examined in the dorsal position. HVS samples were collected using sterile swab sticks by Obstetricians with the aid of sterile Cusco's speculum to obtain access into the posterior fornix. The sticks were then recapped aseptically. The names, dates and collection time for each patient was labeled accordingly on the swab container and transferred to the laboratory for analysis within 20 minutes.

**Table 1: Distribution of samples among the three zones of Imo State**

Zones	No. of HVS samples		
	No. Screened	No. Infected	(%) Infected
OWERRI	317	68	21.5
ORLU	161	28	17.4
OKIGWE	100	22	22.0
TOTAL	578	118	20.4

**Table 2: Prevalence rate with respect to age group of pregnant women in Imo State**

Age group (years)	Owerri zone		Orlu zones		Okigwe zone		Total Imo State	
	No. screened	No. (%) infected	No. screened	No. (%) infected	No. screened	No. (%) infected	No. screened	No. (%) infected
15-20	12	1 (08.3)	01	0 (0.0)	15	2(13.3)	28	3 (10.7)
21-25	96	13(13.5)	44	5(11.4)	16	2(12.5)	156	20 (12.8)
26-30	102	16(15.7)	60	8 (13.3)	20	4(20.0)	182	28 (15.4)
31-35	68	20(29.4)	33	6 (18.2)	20	4 (20.0)	121	30 (26.4)
36-40	33	15(45.5)	21	8 (38.1)	19	6 (31.6)	73	29 (39.7)
Above 40	06	3(50.0)	02	01 (50.0)	10	4(40.0)	18	8 (44.4)
<b>Total</b>	<b>317</b>	<b>68(21.5)</b>	<b>161</b>	<b>28(17.4)</b>	<b>100</b>	<b>22(22.0)</b>	<b>578</b>	<b>118(20.4)</b>

**Table 3: Prevalence rate with respect to trimester of pregnant women in Imo state**

Trimester	Owerri zones		Orlu zone		Okigwe zone		Total Imo State	
	Number screened	No. (%) infected	Number screened	No. (%) infected	Number screened	No. (%) infected	No. screened	No. (%) infected
First	55	7(12.7)	12	1(08.3)	33	4(12.1)	100	12(12.0)
Second	157	23(14.6)	70	9(12.9)	32	5(15.6)	259	37(14.3)
Third	105	38(36.2)	79	18(22.8)	35	13(37.1)	219	69(31.5)
<b>Total</b>	<b>317</b>	<b>68(21.5)</b>	<b>161</b>	<b>28(17.4)</b>	<b>100</b>	<b>22(22.0)</b>	<b>578</b>	<b>118(20.4)</b>

## Isolation of Candida

Culturing for isolation of the organism was carried out using standard laboratory materials and procedure as described by [26]. The plates were incubated at 37°C for 24 - 72 hours. After incubation, the colonies formed were observed and morphology recorded.

Isolates obtained were stained using Gram Staining procedure as described by [26] for identification of the isolates. The results were recorded.

Results are presented using tables and analyzed using simple statistical methods; percentages and averages.

## RESULTS

Out of the 578 samples used, 118 were positive for *Candida albicans* giving a prevalence of 20.4% (Table 1). The highest prevalence of 22% was obtained in Okigwe zone followed by Owerri zone with 21.5% while Orlu Zone had the lowest prevalence of 17.4% (Table 1).

The ages of the 578 women range from 15 years and above. The frequency distribution of the ages shows that generally, the highest number of women 182 (102, 60, 20 for Owerri, Orlu and Okigwe respectively) screened was of the age range 26 -30 years followed by age range 21-25 years, in Okigwe though, the age group 26-30 years and 31- 35 years had same population (20) followed by 36-40 years (19) contrasting Owerri and Orlu which had more subjects in age groups 21-25 years (96 and 44 respectively) than in 31-35 years (68 and 33 respectively) and 35-40 (33 and 21 respectively). In all the zones the age group above 40 (6, 2 and 10 respectively) had the lowest number of subjects followed by 15-20 (12, 1 and 15 respectively that is 28) years (Table 2). The highest prevalence 44.4% (50, 50 and 40% respectively) was recorded in the age group above 40 years and decreased sequentially with the lowest prevalence of 10.7% (8.3, 0 and 13.3 respectively) being recorded for age group 15 -20 years (Table 2).

In relation to gestational age, generally the highest number of subject was recorded for the third trimester though this varied across the zone but the highest prevalence (31.5%) was recorded for the third trimester and the lowest prevalence (12.0%) for the first trimester across the zones (Table 3).

All the questionnaires administered were completed and returned. The analysis of the returned questionnaires revealed that 79.8% (253), 85.7% (138) and 80% (80) of those tested and 70.6% (48), 78.5% (22) and 72.7% (16) that tested positive for the organism at Federal Medical Centre (FMC) Owerri, IMSUTH Orlu and General Hospital Okigwe respectively i.e 82.5% (477) of those tested and 72.9%

(86) of those that tested positive in Imo State as a whole were asymptomatic of any infection during the time of sample collection.

## DISCUSSION AND CONCLUSION

From the foregoing, it is evidenced that *C. albicans* is significantly present among pregnant women in Imo State most of whom are unassuming and unsuspecting, with a prevalence rate of 20.4%. This makes the presence of the organism even more worrisome as most Nigerians especially the typical Ibos will wait for symptoms of ailment before going to hospital or taking treatment. It is the more worrisome because this organism may build up in the system and cause harm to the foetus as it passes through the birth canal hence an asymptomatic mother may give birth to a symptomatic baby showing low birth weight, typical candidal rashes etc.

This prevalence of 20.4% we report corresponds with prevalence reported in pregnant women in different parts of the globe by different researchers, which indicate the prevalence is around 20% (eg, 19.2% in Brazil [7]; 20.8% in Poland [15]. However, in a review, Ferrer [10] cites prevalence values between 30% and 40% while Akinbiyi *et al*., [27] cites prevalence as low as 12. 5% in Yorkshire, United kingdom.

In Nigeria too some researchers have reported prevalence of *C.albicans* similar to our findings in different parts, of Ekwempu in Zaria, reported 20.9% among women in labour in Zaria [28]; 21.5% in Calabar [29], 24% in Ile- Ife [30], 27.5% in Abakaliki [31], 29.1% in Jos [32] while much higher prevalence have been reported in different parts, Benin city Nigeria, Akerele *et al.*, [33] reported a high prevalence of 65% in relation to other uropathogens. In Biu, North eastern Nigeria 56.3% was reported [34], 37.8% in Ilorin [35] among asymptomatic pregnant population while much lower 2.2% prevalence was reported in Ibadan Nigeria [36] among adult women.

The prevalence around the different zones of the state shows a great level of similarity 21.5%, 17.4% and 22% respectively with Okigwe zone having the highest prevalence followed closely by Owerri and Orlu being lowest. This is expected because Okigwe is more of a rural dwelling having mostly people of low economic, academic and hygienic values while FMC being both a federal and referral institution gets patients from different nooks and crannies of the state both urban, periurban and rural. IMSUTH is in the centre of Orlu urban, hence most of the patients are literate and more hygienically inclined yet the prevalence of 17.4% in such a place is still worrisome and deserving of concerted remediation.

The distribution by age corresponds with the age in which most pregnancies occur in Imo State; it is very uncommon to have females younger than 15 years or older than 45 being pregnant in this part of the world; most pregnancies occur in women between 20 and 38 years of age. This is in line with the findings in Cuba [37]. In a similar study in Jos [32] peak age was at 30-39 yrs.

This study shows that prevalence of *C. albicans* generally increased with age, with the age range 40 and above showing highest prevalence and 15-20 years having lowest prevalence. This corroborates data from Jos [32] and the opinion that cumulative years of sexual exposure may as well be a contributory factor to this trend, although the hormonal influence may not be ruled out. However, it contrasts a report in Cuba of higher prevalence in women younger than 20 years [37].

Prevalence also increased significantly with increasing trimester around the state (Table 3) with the highest prevalence observed in the third trimester corroborating the earlier reports [12].

Conclusively, the prevalence obtained in this study is worrisome especially as most of the pregnant women were asymptomatic and unaware of the underlying attendant implications. Keeping in mind that this infection can be a cause of premature childbirth and indirectly cause of newborn deaths, our study results justify the necessity to increase measures against this infection during gestation -- including correct diagnosis and appropriate treatment as well as educating our population about undesirable effects and health implications of these infections.

*Candida* thrives in a moist, warm environment, hence pregnant women should avoid wearing tight jeans, synthetic underwear, or panty liners unnecessarily. Damaged skin and mucosa encourage growth and dissemination of *Candida* hence, habits that cause bruises and lacerations should be avoided. A routine syndromatic management would mitigate against the unexpected adverse consequences of candida infections in pregnancy. It is best to refrain from using perfumed soap, bubble bath, vaginal deodorant, and douches.

Women should be adequately enlightened on the need for prompt and timely investigations and treatment of all urogenital symptoms (14). This would help in the control of candidiasis [32, 33].

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## Other sources

MedlinePlus Encyclopedia Vaginal yeast infection  
[www.wikipedia.org](http://www.wikipedia.org)

**APPENDIX 1: ETHICAL PERMISSION LETTER**

**FEDERAL MEDICAL CENTRE, OWERRI**

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BSc, AMAN

2<sup>nd</sup> April 2008

FMC/OW/HCS.11/057

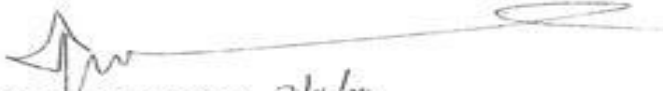
Anyadoh, Syvile O  
Department of Biotechnology  
School of Science  
Federal University of Technology,  
Owerri.

**RE: PROVISIONAL PERMISSION TO CARRY OUT RESEARCH  
MICROBIAL PROFILE OF PREGNANT WOMEN ATTENDING  
ANTENATAL CLINIC IN IMO STATE.**

The Ethical committee acknowledges receipt of your research proposal dated  
27<sup>th</sup> March 2008

You are given provisional permission to carry out the said research.

You are also to ensure patients' confidentiality in this regard.

  
**DR. A.U. ONOYONA** 2/4/08  
HEAD OF CLINICAL SERVICES/CHAIRMAN ETHICAL COMMITTEE.

## APPENDIX TWO

### CONSENT FORM

I, [REDACTED] of Quaker University hereby consent to this study. I acknowledge that I have been fully counseled on the implication of the study. I understand that the study is to be carried out solely for the purpose of medical research and I am willing to participate for the purpose, on the understanding that I shall be entitled to withdraw this consent any time.

Date 11/21/2009

Signed  
(Patient)



I confirm that I have explained to the patient the purpose and nature of the study and that the fact that refusal to participate will not in any way affect her normal care by any member of the institution. I know the consequences of any false declaration on this or any other form.

Date 01/12/2009

Signed  
(Researcher)



## APPENDIX THREE: SAMPLE OF COMPLETED QUESTIONNAIRE

009

**DEMOGRAPHIC DATA**

1. Name: \_\_\_\_\_
2. Age: 16-25 ☐ 26-35 ☐ 36-45 ☒ 46-55 ☐ Above 55 ☐
3. Sex: Female
4. Marital Status: MARRIED
5. Occupation: TEACHING
6. Academic level: Primary ☐ Secondary ☐  
Tertiary ☒ Vocational ☐

**OBSTETRIC/CLINICAL DATA**

8. Parity (Number of Pregnancy) 6 (Six)
9. Gestational age (Stage of Pregnancy)  
1<sup>st</sup> trimester ☐ 2<sup>nd</sup> trimester ☐ 3<sup>rd</sup> trimester ☐
10. Do you any symptoms of ailment? Yes ☐ No ☒
11. If 10 is yes, what symptoms: \_\_\_\_\_
12. Do you have any underlying ailment? e.g. diabetes etc.  
Yes ☐ No ☒
13. If 12 is yes, what ailment: \_\_\_\_\_

**LABORATORY RESULT (FOR RESEARCHER'S USE)**